



Exhibit A

Explanation of Proposed Revisions to Guidelines for Certification of Combined Heat and Power Systems Pursuant to the Waste Heat and Carbon Emissions Reduction Act, Public Utilities Code section 2840 et seq.

Background

In April 2014, Energy Commission Staff (staff) discovered a unit-conversion typo in the text of Form CEC-2843 Application for Certification as a Qualifying CHP System (Form-2843) included in the *Guidelines for Certification of Combined Heat and Power Systems Pursuant to the Waste Heat and Carbon Emissions Reduction Act, Public Utilities Code section 2840 et seq* (Guidelines). Shortly after finding the unit-conversion typo, staff discovered a calculation error in the Portable Document Format (PDF) of Form-2843 which was resulting in incorrectly averaged values in Tables 1A and 1B. In response to these discoveries, staff conducted a full review of the Guidelines and the underlying calculations of Form-2843 in order to identify any additional corrections or revisions that may be needed. This review revealed a number of minor typographical errors, vagaries, and inconsistencies.

Through the experience of processing certifications under the Guidelines, staff has identified many common points of confusion among applicants and Certified System representatives using Form-2843 (Users). These revisions provide an opportunity to clarify or expand instructions within the Guidelines that make the process of applying or demonstrating annual compliance clearer and more efficient.

The proposed revisions correct all of the above errors and make clarifying changes to vague, incomplete, or misleading language. This document outlines all proposed revisions, organized by sections found in the Guidelines, and provides an explanation for each revision.

Proposed Revisions

Schedule A of Appendix A and Annual Schedule A of Appendix B

Appendices A and B have slightly different versions of Schedule A. Unless otherwise specified, recommendations are for both versions.

Staff recommend:

1. Correcting formulas that calculate the Average Annual Hourly Values for Tables 1A and 1B.

Explanation: Currently, the formulas average values over the annual total for standard hours. Instead, they should average over the generator equivalent full load hours as specified in the table footnotes.

2. Correcting note in item 3, 'Other Greenhouse Gases, Emission Factor' to recommend a value of 0.11 lb/MMBtu.

Explanation: Currently, the note suggests 0.05 lb/MWh. This is the result of a unit conversion error. Based on the note's stated default values for methane and nitrous oxide, the actual total value should be 0.11 lb/MMBtu.

3. Correcting footnotes in Tables 1A and 1B, and making the language clear and consistent.

Explanation: Currently, the footnotes for Tables 1A and 1B in Appendix A are not labeled properly, and the language is inconsistent. In Appendix B, these tables do not have any footnotes. Tables in both appendices should be corrected and made consistent.

4. Changing the February Standard Hours per Month value in Tables 1A and 1B of Appendix A to 672. In Appendix B, allowing this same value to be edited by Users, but setting it to 672 by default.

Explanation: Currently, this cell is fixed at 696 hours, which is the number of hours in February during a leap year. This results in incorrect hourly averages when Users enter monthly data from a non-leap year. The purpose of Appendix A is to predict average annual performance characteristics, and so a non-leap year should be used. Allowing user input in Appendix B will enable Users to enter the appropriate number of hours each year, and setting the default to 672 will be more efficient as this is the more frequent value.

5. Automating calculations in tables.

Explanation: Currently, two table columns require the User to perform calculations based

on other columns: Table 1A of Appendix A requires the user to enter the lesser of the values in columns 11 and 12 into column 13, and Table 1B in both appendices requires the user to enter the difference of the values in columns 9 and 10 into column 11. Automation will remove the possibility for errors in these calculations.

6. Removing notes regarding consistent units on pages A-8 and B-5.

Explanation: The fields these notes refer to are automatically calculated and do not require action by the User. Instructing the User to use certain units implies that the User should be performing the calculations and leads to confusion.

7. Clarifying note regarding qualifying efficiencies on page B-5.

Explanation: This note does not specify whether percentages apply to topping or bottoming cycle systems. This vagary has led some Users to believe they must fill out both Table 1A and Table 1B. Explicitly stating which kind of cycle the efficiency applies to will reduce confusion.

Schedule PF of Appendix A

Staff recommend:

8. Making the following changes to calculations:
 - a. Automating items 8 and 10.
 - b. Removing automatic field filling for items 4, 5, 7, and 9, and changing these fields to require User input.
 - c. Correcting item 6 to automatically calculate the difference of items 4 and 5.

Explanation: Items 8 and 10 currently require the User perform simple calculations, which burdens the User and unnecessarily creates opportunities for error. Automation will prevent this. Items 4, 5, 7, and 9 currently automatically use values from Table 1A. This is not appropriate, as Table 1A represents annual averages, and Schedule PF should represent maximum values at full system load operation. Users should manually enter these values according to their system specifications. Item 6 automatically uses a value from Table 1A instead of performing the subtraction indicated in the text. The calculation should be updated to perform the subtraction automatically.

9. Making the following text edits for consistency:
 - a. Editing the MMBtu per MWh unit conversion value text in item 1 from 3.412 to 3.4121.

- b. Changing text in item 9 from “Recovered...” to “Net Recovered.”

Explanation: The text change for line 1 will now reflect the actual conversion value used. The new text in item 9 will now be consistent with text describing the same quantity in Table 1B.

10. Removing the following text:

- a. Variable names F_{Peak} , E_{net} , Q_{net} , and M_{net} .
- b. Language in items 8 and 10 which implies the User should perform calculations.
- c. Efficiency note at the bottom of page A-13.

Explanation: The referenced variable names are not used anywhere in the document and are not needed. Additionally, their similarity to variable names in Tables 1A and 1B has caused confusion for Users, who sometimes interpret this as an instruction to transfer values from these tables. Items 8 and 10 are now automatically calculated (see above), and this text change reflects that fact. The removed efficiency note should be better explained in the instructions for Schedule PF.

11. Updating instructions on page A-15 to provide greater clarity and reflect the other proposed changes to Schedule PF.

Explanation: Staff frequently encounters confusion from Users regarding Schedule PF. The proposed changes will clarify the purpose of Schedule PF, explicitly instruct the User on which fields they need to fill out, and more clearly outline which portions of Schedule PF apply to topping or bottoming cycle systems.

Schedule NO_x of Appendix A and Annual Schedule NO_x of Appendix B

Appendices A and B have slightly different versions of Schedule NO_x. Unless otherwise specified, recommendations are for both versions.

Staff recommend:

12. Changing text in items 1-4 to match the corresponding column names in Table 1 and specify that annual totals should be used.

Explanation: The values for many of the items in Schedule NO_x are taken directly from Table 1. The most common errors Users make on this schedule are copying values from the incorrect area of Table 1 and using average values instead of annual totals. These language changes will help to clarify which Table 1 values should be used.

13. Removing item 9.B and all associated language, removing all language that distinguishes between 9.A and 9.B, and setting the new item 9 to automatically calculate NO_x emissions.

Explanation: Currently, item 9 is split into two parts, A and B, for NO_x emissions from a topping or bottoming cycle system, respectively. However, both parts are calculated the same way, from the same values in Schedule NO_x, regardless of which kind of system the data comes from. This makes calculating two values redundant and potentially confusing. Item 9 should be consolidated into a single value for NO_x emissions that does not distinguish between system types. Additionally, item 9 requires the user to perform a simple calculation, which burdens the User and unnecessarily creates opportunities for error. Instead, item 9 should perform this calculation automatically.

14. Updating schedule instructions to reflect changes, remove ambiguity, and explicitly guide the User through transferring values from Table 1.

Explanation: These changes will clarify a common point of confusion and explicitly guide Users through transferring the appropriate values from Table 1.

General Revisions

This section describes proposed revisions that either apply to a section of the Guidelines not included in Form-2843 or apply generally across Form-2843.

Staff recommend:

15. Revising text of section V.b to allow the Energy Commission flexibility in reviewing Annual Compliance documents.

Explanation: The original intent of section V.b was to allow the Energy Commission the flexibility to assume that a system's Annual Certification documents (Appendix B of Form-2843) are accurate and true. In the event that the Annual Certification is challenged, the section requires the Energy Commission to review the documents. However, the current language unintentionally restricts the Energy Commission from performing annual reviews. The proposed revisions correct this language and bring the text of section V.b back into agreement with its original intent.

16. Standardizing unit conversions in automatically calculated fields.

Explanation: Currently, unit conversions are hard coded in the underlying formulas for Form-2843. When originally coded, slightly different conversion values were used. In order to guarantee consistency, all unit conversions should now refer to common conversion values, as follows:

- a. 3.4121 Million British Thermal Units per Megawatt Hour (MMBtu/MWh)
- b. 1,341 horsepower hours per Megawatt Hour (hp-hr/MWh)
- c. 0.002544 Million British Thermal Units per horsepower hour (MMBtu/hp-hr)

17. Standardizing the appearance of fields that require User input or are automatically calculated so that the User can more easily distinguish between the two.

Explanation: Currently, fields are displayed as a blue box, a blue box with a red border, or a clear box with no border. However, these different appearances are not used consistently. For ease of reading and greater clarity, fields requiring User input should appear as blue boxes without a border, and those that are automatically calculated should appear as a clear box with no border.

18. Simplifying and optimizing underlying structure and code within Form-2843, including simplifying JavaScript for field calculations and optimizing the field calculation order.

Explanation: During review, staff identified several opportunities to streamline and optimize calculations underlying Form-2843. These changes will greatly simplify the underlying form structure, which will make future edits easier and reduce the opportunity for coding errors. These changes will not visibly alter appearance or function, and are solely for development and optimization purposes.

19. Setting all fields containing a percentage to truncate, instead of round, those values.

Explanation: Currently, percentage values are rounded. This can result in a situation where a system falls below the required Energy Conversion Efficiency Standard, but appears to meet the standard due to the value being rounded up. Truncating will prevent this from happening.

20. Standardizing number formatting, correcting minor typographical errors, and updating Staff contact information.

Explanation: Staff identified several non-substantive typographical errors and number formatting inconsistencies that should be corrected.